



MISSISSIPPI POWER & LIGHT COMPANY

*Helping Build Mississippi*

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NUCLEAR LICENSING & SAFETY DEPARTMENT

August 7, 1984

Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station  
Units 1 and 2  
Docket Nos. 50-416 & 50-417  
License No. NPF-13  
File: 0260/L-860.0  
Environmental Impact of  
Requested Exemptions  
AECM-84/0413

Based on requests from your staff and in support of evaluations required by 10 CFR 51.30, Mississippi Power & Light Company (MP&L) is providing the attached discussion which addresses the question whether there are any significant changes in environmental impact associated with exemption requests made by MP&L on July 28, 1984 and August 2, 1984 (MP&L letters AECM-84/0390, 0399, and 0411).

As discussed in the attachment, there is no significant increase in environmental impact associated with the exemptions over the environmental impact associated with no exemption. As a result, MP&L believes that there is ample basis for the NRC staff to conclude that there is no significant environmental impact associated with granting the requested exemptions.

Sincerely,

L. F. Dale  
Director, Nuclear Licensing & Safety

LFD/sl  
Attachment

cc: (See Next Page)

8408140116 840807  
PDR ADOCK 05000416  
P PDR

Member Middle South Utilities System

Cool  
41

cc: Mr. R. B. McGehee (w/o)  
Mr. N. S. Reynolds (w/o)  
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung (w/a)  
Office of Inspection & Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. J. P. O'Reilly (w/a)  
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U.S. Nuclear Regulatory Commission  
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POTENTIAL  
ENVIRONMENTAL IMPACT  
ASSOCIATED WITH  
REQUESTED EXEMPTIONS

I. PERMANENT APPENDIX J EXEMPTION FOR CONTAINMENT AIR LOCKS

MP&L letter AECM-84/0411 dated July 28, 1984 requests an exemption to certain 10 CFR 50, Appendix J containment airlock testing requirements. The only potential incremental environmental impact is related solely to increased probability of containment leakage during an accident. Other areas of environmental impact, namely radiological and non-radiological effluents and other non-radiological consequences or impacts are not affected by the requested exemption. In regard to the containment air lock exemption, the containment air locks are points of routine access with the containment and have no bearing on the plant radiological or non-radiological effluents. The exemption sought in this case, therefore, has no adverse impact on the normal operation effluents or, for that matter, in any non-radiological areas.

Section II of the attachment to the referenced exemption request specifically addressed the protection of life and property. The portion of Appendix J to which the exception applies is paragraph III.D.2(b)(i) which requires that "Air locks opened during periods when containment integrity is not required by the plant's Technical Specifications shall be tested at the end of such periods at no less than  $P_G$ ." In lieu of this requirement, Technical Specification 4.6.1.3.b.2 requires that an overall air lock leakage test be conducted at  $P_G$  when maintenance has been performed on the air lock that could affect the air lock sealing capability. This Technical Specification contains a footnote stating that this requirement is an exemption to Appendix J to 10 CFR 50.

A further Appendix J requirement for a similar test in paragraph III.D.2.(b)(iii) within 3 days after being opened (or at least once every 3 days for openings more frequent than every 3 days) specifies that air lock seal tests satisfy the 3 day test requirements. GGNS Technical Specification 4.6.1.3.a corresponds to and complies with this portion of Appendix J.

Because of Technical Specification surveillance requirements, the requested exemption involves a de facto requirement for an air lock seal test in lieu of the II.D.2.(b)(ii) test. As noted above, II.D.2.(b)(iii) already allows an air lock seal test in lieu of a similar required air lock test at a pressure of not less than  $P_a$ , thus recognizing the implicit equivalence of these tests under similar circumstances.

As a result, it can be concluded that there is a reasonable assurance against undue air lock leakage provided under the exemption and that no material increase in the probability or extent of air lock leakage (i.e., in excess of the design value for post accident containment leakage) is to be expected. Therefore, there is no significant increase in the probability of higher post accident offsite (or for that matter onsite, e.g., control room) doses related to the exemption and therefore no significant increase in environmental impact beyond that experienced with no exemption.

## II. SCHEDULAR EXEMPTIONS FOR DIESEL GENERATOR ELECTRICAL PROTECTION

MP&L letter AECM-84/0399 dated July 28, 1984, as supplemented by letter AECM-84/0390 dated August 2, 1984, requests partial schedular exemption to 10 CFR 50, Appendix A, Criterion 17 (GDC 17) concerning electrical protection of the plant diesel generators.

These exemptions have potential incremental impacts involving accident consequences and probabilities and post accident occupational exposure. The

functionability of the diesels is not materially degraded under these schedular exemptions for the reasons shown in the exemption request as supplemented. Accident consequences to the public or workers are not changed and accident probabilities are not materially affected.

To facilitate preparation of an environmental assessment, all accident and transient events analyzed in the GGNS FSAR Chapter 15 can be divided into two general categories. One category of events includes those events which have been explicitly or implicitly addressed in a recent NRC sponsored risk assessment of Grand Gulf (RSSMAP). These events are the most significant in terms of the radiological consequences and include, generally, accidents involving loss of coolant and certain transients which may lead to degraded decay heat removal capability. The second category of events includes the non-RSSMAP events which are predicted to result in some radiological consequences, such as fuel handling accidents, offgas system failure, etc. Although these events result in consequences significantly below that predicted for the RSSMAP events, they are treated here because of their inclusion in the FSAR Chapter 15 events. Section II.A discusses the incremental environmental impacts from the requested exemptions from the perspective of RSSMAP evaluated events. Section II.B discusses the same impact with respect to the non-RSSMAP events.

Other areas such as radiological and non-radiological effluents and other non-radiological consequences or impacts are not affected by the requested exemption. By similar reasoning, the on-site diesel generators, which are provided in the event of off-normal situations, have no bearing on these effluents under normal operating conditions. The exemptions related to the diesels therefore have no adverse impact on these effluents or in any non-radiological areas.



## II.A ENVIRONMENTAL ASSESSMENT - RSSMAP EVENTS

### II.A.1 HPCS Diesels

Two of the exemption requests involve the HPCS diesel generator:

- (1) the requested schedular relief on the second level of undervoltage protection, and
- (2) the requested schedular relief on emergency test mode override.

In both cases, although the GGNS design does not meet current interpretation of regulatory requirements, there are relevant protection features which provide assurance that the HPCS diesel will function on demand even with assumed failures of protective features.

The HPCS is available as a source of high pressure makeup in the event of reactor isolation or a small break LOCA which is too small to depressurize the reactor. In the event of a Loss of Offsite Power (LOP), a separate Division III diesel generator is provided to supply power to the HPCS pump and support system.

In particular, for a small break LOCA (the primary event for which the HPCS System is designed), if the HPCS System fails, protection against exceeding the design limits is provided by the steam driven Reactor Core Isolation Cooling System and by the Automatic Depressurization System in conjunction with the Low Pressure Core Spray (LPCS) and Low Pressure Coolant Injection (LPCI) Systems.

The incremental risk associated with the requested exemptions involves primarily the question whether there is any significant increased probability of a HPCS system failure on demand due to the lack of a second level of undervoltage

protection or emergency test mode override. As described in the exemption requests there are basic design features of the system which provide compensatory assurance that the HPCS diesel will function properly. Both exemptions involve the level of protection against HPCS diesel failure or degradation of performance resulting from a degraded grid. The features which tend to assure that this will not happen are outlined below for each exemption:

- (1) Exemption on a second level of undervoltage protection,
  - (a) Redundant single level of undervoltage protection,
  - (b) Equipment resistant to effects of undervoltage,
    - (i) HPCS pump and associated equipment protected against persistent undervoltage,
    - (ii) Division III battery charger has degraded performance below 85% but is not damaged; DC power is backed up by batteries,
    - (iii) MOV's are protected except for narrow 72-75% undervoltage range;
- (2) Exemption on emergency test mode override,
  - (a) Basic design of diesel-generator will withstand degraded grid voltage down to 72%,
  - (b) Diesel trips are bypassed as appropriate if a LOCA signal occurs during a test.

As a result the probability of a HPCS system failure resulting from a simultaneous degraded grid and failure of the protection features to operate properly is very small and has an insignificant incremental impact on risk associated with post-accident offsite or occupational doses.

An estimate of the quantitative effects associated with such considerations can be obtained by inspecting the results of the recent NRC sponsored risk assessment of Grand Gulf. Volume 4 of NUREG/CR-1659 describes the results of the application of RSSMAP to Grand Gulf (see Reference 1).

The RSSMAP study conservatively assumes that core melt results from a failure to meet FSAR requirements for successful accident mitigation. The entire range of possible radioactivity releases from such events are divided into four non-overlapping ranges and referred to as "release categories". Figure 6-1 of RSSMAP displays the dominant accident sequences. A review of RSSMAP indicates that those accident sequences for which high pressure makeup from HPCS or RCIC is a significant contributor, fall into Release Category 3. The dominant accident sequences for this release category contribute only about 3 percent to the overall core melt frequency. Two of the three dominant sequences are initiated by a LOP which would require Division III diesel generator operation. These sequences have a core melt frequency approximately an order of magnitude less than the sequence with the highest core melt frequency.

A review of the dominant contributors or cut sets for these sequences in Chapter 6 of RSSMAP indicates that the unavailability of the Division III diesel generator represents only a partial contribution to the total core melt frequency for these sequences. Since these features of the diesel generator control system are only one of the many possible contributors to diesel generator unavailability, it can be concluded that the change in core melt frequency due to diesel generator failure due to lack of these additional protective features would be extremely small, if any.

#### II.A.2 Division I and II Standby Diesel Generators

One of the exemption requests involves the standby diesel generator ground overcurrent trip which is required by current interpretations of the regulations to utilize coincident logic or be bypassed under accident conditions.

The GGNS design has neither approach, but, as is discussed in the exemption requests, other protection is provided. In particular, ground relays associated with feeder breakers will act to isolate the ground overcurrent fault before the



generator trips. The standby diesel generators are also low resistance grounded at the generator neutral and are provided with inverse time delay static overcurrent relays. The application and coordination of the protective devices has been analyzed and determined to be of such reliability that degradation of the distribution system will occur very infrequently due to spurious ground fault trips.

As a result, it can be concluded that the incremental impact on composite accident risk considering accident consequences and probability of an accident and their resultant impact on post-accident offsite and occupational dose is not significant.

An estimate of the quantitative effects associated with such considerations can be obtained by inspecting the results of a recent NRC sponsored risk assessment for Grand Gulf. Volume 4 of NUREG/CR-1659 describes the results of the application of RSSMAP (see Reference 1) to GGNS.

The RSSMAP study conservatively assumes that core melt results from a failure to meet FSAR requirements for successful accident mitigation. The entire range of possible radioactivity releases from such events are divided into four non-overlapping ranges and referred to as "release categories". Figure 6-1 of RSSMAP displays the dominant accident sequences. Release Category 2 sequences contribute over 90% of the overall core melt frequency. Two of the dominant sequences in Release Category 2 have Loss of Offsite Power (LOP) as the initiating event and would therefore require availability of the diesel generators. However, the accident sequence with the highest core melt frequency is a transient initiated event other than a Loss of Offsite Power. This event has a core melt frequency which is at least a factor of 2 greater than the dominant LOP initiated event.

The dominant contributor, or cut sets, of these sequences are described in Chapter 6 of RSSMAP. The unavailability of the Division I and II diesel

generators represents only a partial contribution to the core melt frequency for these sequences. Since these features of the diesel generator control system are only one of the many possible contributors to diesel generator unavailability, it can be concluded that the change in core melt frequency due to diesel generator failure due to lack of these additional protective features would be extremely small, if any.

## II.B ENVIRONMENTAL ASSESSMENT - NON-RSSMAP EVENTS

The assessment of environmental impact of the subject diesel generator requested exemptions with regard to those accident and transient scenarios addressed by the GGNS RSSMAP evaluation is provided in the preceding discussion (II.A). This section treats the assessment of the subject impact in the area of radiological effluents, non-radiological effluents, and any other non-radiological hazards for accident and transient events not addressed in the GGNS RSSMAP (principally non-LOCA transients). The basis for this qualitative assessment is Chapter 15 of the GGNS FSAR.

Those events not addressed in the GGNS RSSMAP but analyzed in Chapter 15 of the GGNS FSAR may result in predicted radiological consequences. Some events included in this category are, for example, failure in the offgas system, fuel handling accident, mis-loaded fuel bundle transient, and cask drop accident. However, not only do these events make very little or no contribution to the overall core melt frequency, but also they are unrelated to the Division III power supply and, because they do not generate LOCA signals, do not implicate Division I and II either.

In that HPCS is not required to mitigate the consequences of events addressed in this category, the exemptions requested as they relate to the Division III power supply have no impact on the radiological consequences relative to that already presented in the GGNS Chapter 15 analyses.

With regard to the exemption request related to the Division I and II diesels, the subject emergency trip (ground overcurrent) would be bypassed (full compliance) only if a LOCA signal were present. None of the events in this category involve conditions which give rise directly to high drywell pressure or low vessel water level. In the absence of a LOCA signal, full compliance with Regulatory Guide 1.9 (Revision 2), e.g., bypass of trips under LOCA, would have no mitigative effects on events in this category. The exemption request related to the Division I and II diesels, therefore, has no radiological impact relative to that already analyzed in Chapter 15 of the FSAR.

With respect to non-radiological effluents, such as toxic or hazardous gas, the site emergency power supplies play no role in mitigating the consequences of events leading to non-radiological effluent releases. The same reasoning applies to other non-radiological hazards, e.g., noise. For these reasons, the exemptions sought are considered to have no incremental environmental impact in the area of non-radiological hazards or effluent releases.

### III. SUMMARY

In summary, based on the above discussions, there is no significant adverse incremental environmental impact associated with the requested exemptions. As a result, the assessment of environmental impact poses no obstacle to granting the requested exemptions.

### IV. REFERENCES

1. "Reactor Safety Study Methodology Application Program, Grand Gulf #1 BWR Power Plant," NUREG/CR-1659, Volume 4 of 4.